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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE.



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Edited by WATSON DAVIS

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DO YOU KNOW?

Some Babylonian scholar invented the division of the circle into 360 degrees, minutes, and seconds.

A new electric fan has blades made of silk ribbon loops which create a breeze for a distance of ten feet.

With color movies a blush can be made to suffuse an actress' cheek by the trick of throwing red light there.

The differences between a primitive people and a civilized people are really superficial, says one well-known anthropologist.

It was Captain John Smith of Virginia Colony fame who gave "poison ivy" its name after an unpleasant encounter with it.

Brazil is making strenuous efforts to solve its leprosy problem, and is building preventorium where children of leprosy parents may avoid danger of contact.

One company advertises its insect killer on paper that has been scented with the stuff, thereby showing that it is not obnoxious to human noses.

A physician in the Dutch East Indies reported cure of a leprosy case with ultra-violet rays, but final conclusions as to value of the treatment have not been drawn.

As a general rule, large birds live longer than small ones.

Lacking petroleum resources, the Philippine Islands are using alcohol as motor fuel in considerable quantities.

Death Valley last summer complained of too much rain—six-tenths of an inch—which "flooded" the desert floor, making it a lake.

Four hundred species of Mexican plants that can be grown in the United States, in certain climates, are described in a new book.

Members of the California Mycological Society pay their annual dues in puffballs and other fungi.

Government scientists are attempting to adapt cotton stripping machinery to gathering pyrethrum flower heads, used in insecticides.

Says the U. S. Department of Agriculture: All rare old vintages bear the numerals of a year when growing conditions in the vineyards were exactly right.

Leonardo da Vinci named as the fundamental colors for painters white for light, yellow for earth, green for water, blue for air, red for fire, and black for darkness.

WITH THE SCIENCES THIS WEEK

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MEDICINE-NEUROLOGY

Trigger Mechanism in Brain Trips Epileptic Convulsions

Discovery by Harvard Experimenters May Cause Change In Epilepsy Diagnosis—Not a Diseased Condition

MEDICINE has discovered the part of the brain believed to cause convulsions like those occurring in epilepsy. The convulsion-causing brain center acts like a "trigger" which, when stimulated, sets off a neurological "explosion" throughout the whole brain.

Drs. F. A. and E. L. Gibbs of Harvard Medical School described before the meeting of the International Neurological Congress at London experiments leading to the discovery of the brain trigger.

The trigger is a short fiber system running between the frontal cortex basal ganglion and the thalamus.

Parallel research on brain tumors of cats and in man indicate, the scientists reported, that the same part of the brain is responsible for convulsions in each.

Studies on four hundred cats in which the trigger mechanism was stimulated by means of an electrode inserted through a small hole in the skull served to determine finally the location of the convulsion-causing brain fibers.

It is not believed that the trigger is a pathological mechanism. Dr. Gibbs believes it is present in all brains, normal or otherwise, but that in epilepsy the mechanism is disordered.

The position of the mechanism, the scientist said, is now located as well as are the brain fibers controlling the dilatation of the eye's pupil.

The Harvard experiments provide strong evidence that former ideas about the cause of convulsions were wrong. It had been suggested that convulsions came about because of stimulation of the blood vessels or of certain other parts of the brain.

The new discovery may change the diagnosis of epileptic convulsions. Dr. Gibbs explained that physicians formerly sought a diseased condition responsible for epilepsy but that as a result of his research they will now have to seek a disorder in the neurological mechanism which he believes is present normally as a safety valve in the brain.

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ENGINEERING

Electricity Brings "Sun" To Low Level Apartments

NEW YORK'S "cliff-dwellers" who live on lower level apartments facing ventilating shafts can now get up in the morning, raise the window shades and be flooded in the glow of artificial sunlight.

Electrical engineers have installed in the court of an apartment on Central Park South a system of powerful electric lights which shine down the dark central shaft and simulate sunlight.

And so that the dawn does not "come up like thunder," as Kipling has it in the Far East, the wiring circuit is so arranged that the glow comes on gradually in the morning for "sunrise" and dies away slowly for "sunset."

Engineers of the General Electric Company, which installed the system, have adjusted the device so that it takes the lamps 15 minutes to come up to full intensity. (*General Electric Review*, July.)

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POPULATION

Migration To Poor Farm Land Seen As National Danger

OUT OF the frying pan, into the fire. This is the predicament of the many thousands of Americans who have been forced by unemployment to desert the city and go "back to the land."

The Government's policy should be to discourage these people from taking roots and settling down permanently in the poor farm areas to which the depression has driven them, in the opinion of Prof. Carter Goodrich of Columbia University, who with his associates, Dr. Bushrod W. Allin and Miss Marion Hayes, has just completed a survey of the migrations of Americans and the planes of living in various parts of the United States.

The unemployed of the present de-



ARTIFICIAL SUNLIGHT

Looking up a ventilating shaft in a New York City apartment house where lights have been installed to simulate the radiance of the sun.

pression were not able to follow the example of those of the past century. They could not "go west" and take up fertile lands in the Government's public domain. Instead they were forced to settle on cheap or abandoned farms in submarginal areas—perhaps returning to the very lands which they or others had deserted as worthless in good times.

These bad lands, including the Cut-over Country of the Great Lakes States, the Old Cotton Belt, and counties in the mountains of the Southern Appalachians, are the parts of the country that normally are deserted in good times by those who can move to the city and find jobs.

In these areas the plane of living is

lower than elsewhere in the nation, even in boom times. These same counties have had excessively high relief loads in the present depression.

"Their low rating by both the prosperity and the depression measures raises a strong presumption that these counties are doomed to permanent poverty unless the pressure of population can be reduced," Dr. Goodrich and his assistants have concluded.

"Whatever directions of migration may in the long run be desirable within the United States, they cannot be those marked out by the depression years," the report states.

"Even if we believed that the trend of our entire history was to be permanently reversed, and that in the future a larger proportion of the American people would have to be supported by agriculture, it would still be obvious that the land which should support them should not be the sort to which so many of the depression migrants have had to turn. There may possibly be a case for a back-to-the-land movement. There cannot conceivably be a case for the long-run desirability of a back-to-the-worst-land movement."

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ASTRONOMY

Will the Royal Observatory At Greenwich be Abandoned?

WILL the world-famous Royal Observatory at Greenwich, England, just on the suburbs of London, be discontinued? Founded in 1675 by royal decree, British astronomers have long been wondering if the observatory has outlived its usefulness.

Dr. Spencer Jones, Astronomer Royal, in his report for the past year recently amazed some of his colleagues by coming out—point blank—with some of the objections to the present site.

Dr. Jones listed as disadvantages (*Science*, July 19):

"The pollution of the air due to the surrounding industrial works and factories by the precipitation of sulphur dioxide, soot and hard grit, is very detrimental to mirrors and other delicate parts of astronomical instruments; the condensation of moisture from hot gases ejected from nearby chimneys is a source of trouble and especially the use

of mercury vapor lamps for street lighting lately introduced in the neighborhood is objectionable because the ultraviolet light they discharge affects photographic plates exposed at low altitudes."

Although the name Greenwich is so intimately woven with all reckonings of longitude and time throughout the world, the abandonment of the Royal Observatory would not be quite the catastrophe that one might think at first consideration.

The present proud position of the Royal Observatory as premier "number one milestone" of the world is a matter of precedent and tradition rather than necessity. Any other spot on the earth which could be agreed upon would do as well.

It's the position of the Observatory—not the Observatory—which is the important matter for the time keepers and navigators of the world.

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PSYCHOLOGY

Adults Learn Faster Than Children and Gain Skills

LEARNING can no longer be considered exclusively a child's occupation to be accomplished in the days of youth when time has small financial value.

The world is changing so rapidly that today's fact may become fallacy within the decade. The trade learned by the boy now may be obsolete before he is an old

man. Adults now feel the need to go to school. And the evil condition of employment scarcity has fortunately brought with it new leisure for the new necessity of adult learning.

But can adults learn? Can the aged develop new skills?

An emphatic answer of yes is provided

by the well-known psychologist of Teachers College, Columbia University, Dr. Edward L. Thorndike. Those past middle age do not learn as fast as those in early adulthood, he has found. But they can and do learn if they want to.

"A man of 65 may expect to learn at least half as much per hour as he could at 25 and more than he could at 8 to 10," says Dr. Thorndike in the introduction to his new book on "Adult Interests" (Macmillan).

Childhood is not the best age for learning, he and other psychologists have found.

The age for learning that is the best in the sense of greatest returns for time spent in study is in the twenties. Any age below 45 is better than ages 10 to 14.

Why is it then that adults do not, as a rule, do much learning? Lack of interest in learning and the pressure of competing interests are the principal reasons, according to Dr. Thorndike.

"Learning always requires time and usually requires some care and effort. It competes for an adult's leisure time and attention with a host of other possible activities—sleep, rest, relaxation, excitement, display, combat, physical and mental exercises of uninteresting sorts, productive labor beyond what is prudent, family devotion, religious observances, and many others.

"To occur, it must be preferred above these, must be more desired, more interesting, either for its own sake or for some consequences expected from it."

The interest does not need to be intrinsic in the subject to be learned. It does not need to be natural. It can be roused by teachers or friends or deliberately by the self.

Adults have been known to learn well matters in which they could not possibly have interest—silly things such as learning to type words backward or toss balls over one's head at an unseen target—when their only reason for wanting to learn was some "ulterior" motive.

"If the person keenly desires to have the status or ability for which unpalatable facts or skills are required, his desire will add sufficient interest to keep his mind working and to strengthen the right thoughts and acts."

Adults should know better than children what knowledge and what skills will be of value to them. Hence the desire to learn should provide the motive power to keep the mind working when interest in the subject itself lags. They should not have as much need as children do for such external bribes as praise, prizes, and promotions.

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ETHIOPIANS WHO CHANGED THEIR SKINS

Four mosquito fishes, originally the same color, which have lived for a time in tanks painted white and black, respectively.

BIOLOGY

Privacy in a Goldfish Bowl If Fish Are of Right Color

Experiments Show That Fish Change Their Color To Match Background—Protection Against Birds

CAN A FISH hide in a gold-fish bowl?

Yes, if it is a white fish in a white fish-bowl, or a black one in a black fish-bowl, should be the answer of Dr. F. B. Sumner of Scripps Institution of Oceanography, University of California, at La Jolla, who has been making some new experiments in color change with fishes.

In earlier experiments he had found out that his fishes would not only change their color, or more properly speaking, shade of color, to suit the background on which they lived, but that if they were left for a month or two living against that background, more or less lasting changes would be made in the actual amount of coloring matter in their skins.

Then Dr. Sumner asked the question, what good does it do a fish to change its color or its spots? Is its marking a protection against enemies, for instance? Many people have thought so, and some have thought not, but nobody had tried to find out.

Two tanks, each eight feet by fifteen, were painted respectively black and very pale gray (called "white" for convenience) and both filled with water two and a half feet deep. Then several hundred *Gambusia*, "mosquito-fish," originally the same color, but half of which were now black and half "white," after a month's sojourn at Scripps Institution on backgrounds of those colors, were turned into the tanks.

As the fishes entered the tanks at one end, penguins were turned loose at the other. At once the chase was on, for the penguins were hungry and did not mind observers.

In the "white" tank where both black and white fishes could be seen, the penguin caught and ate three black fishes to every two white ones. In the black tank, where it was harder to see the black fish, the penguins caught three white to every black one.

Other experiments were made, in which the white or black fishes were given time to adjust themselves to their new background, sometimes for only a few minutes, sometimes even as long as overnight, until to the eye of the human

observer they differed scarcely at all in appearance from fishes which had been continuously on that background. Even then, the birds chose predominantly the fishes of the lots not yet fully adjusted.

Dr. Sumner used about five thousand fishes altogether, and he found on an average that in the pale tanks, where the visibility was greater, about 61 per cent. of the fishes eaten were black, and in the black tanks 73 per cent. were white.

According to Dr. Sumner, these experiments are conclusive evidence that "ability of fishes to adjust their colors to their background is of vital importance to them, at least under attack by fish-eating birds."

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ENTOMOLOGY

Ants Valiant in Defense Of Poison That Kills Them

WARLIKE courage on the part of a species of Puerto Rican ants, in desperate defense of poison deliberately set to kill them, is the story, ironic in its human implications, told by Dr. George N. Wolcott, entomologist of the Insular Experiment Station, Rio Piedras, P. R.

Among the insect pests that cause trouble for coffee growers in Puerto Rico is a species of ant known locally as *hormiguilla*. To get rid of it, entomologists have been experimenting with poison bait consisting of ground meat mixed with the deadly compound thallium nitrate.

On one occasion a quantity of this poisoned bait had been placed by an ant-infested tree. When Dr. Wolcott visited the spot, he found it swarming with insects, many of which were dead.

At first he merely thought that the poison was working effectively. But closer inspection showed that an ant war was in progress. The *hormiguilla* swarm had been attacked by a horde of another ant species, called by the natives *hormigas bravas*, intent on robbing them of the apparently valuable meat. The *hormiguillas* were defending their "rights" to the "property" with considerable success, strewing the ground on most of the battlefield with lifeless bodies.

Here was a war disquietingly like a human war, Dr. Wolcott points out: both sides certain to lose, because the prize was not merely useless, but deadly to the victors.

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PHYSICS

Fly Balloons 21 Miles Up In New Cosmic Ray Study

TEN SOUNDING balloons designed to reach altitudes of 110,000 feet, or nearly 21 miles in the stratosphere, will be released from Fort Sam Houston, Texas, shortly in a new cosmic ray research program outlined by Dr. Robert A. Millikan, California Institute of Technology physicist.

Dr. Millikan and Dr. H. Victor Neher are ready to start their experiment, designed to detect the intensity of cosmic radiation at points far higher than can be reached in manned-balloon flights.

Each of the ten balloons will carry automatic recording cosmic ray electroscopes, a one-dollar bill plus instructions for returning the instruments. A five dollar reward then awaits the finder.

Simultaneously other phases of Prof. Millikan's cosmic ray research are under way. Dr. Carl D. Anderson, also of California Institute of Technology, is atop Pike's Peak taking measurements, while in Manila, P. I., army flyers are planning a series of flights at altitudes of 24,000 and 26,000 feet with automatic recording instruments from Prof. Millikan's laboratory.

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TYPOGRAPHY

Rubber Plates May Offer New Technique In Printing

A PROCESS for printing from rubber plates has been developed by the B. F. Goodrich Company, which promises to alter traditional methods of printing. Rubber plate printing is said to be the first major departure in the art since Johann Gutenberg discarded wooden blocks for movable metal type in the 15th century.

Printing from rubber type is not new itself. Everyone is familiar with the "rubber stamp," which has long been used to stamp out short notices or designs. Until recently, however, rubber as a substitute for metal in jobs requiring thousands of copies was thought to be impractical.

The new "elastotypes," or rubber plates, overcome many of the former objections to rubber as a printing material, and have several advantages over ordinary metal in certain types of work. They are particularly well adapted to printing on fragile or brittle materials such as tissue paper, Cellophane, celluloid, wood, metal, fiber, and glass, which might be injured by metal type. Bond and other hard surfaced papers print better from rubber because it conforms to the irregularities of the paper and is less affected by pressure change. Tests indicate that because rubber spreads a thinner film of ink than metal the saving of ink runs as high as 30 or 40 per cent. For the same reason printing from rubber dries more quickly.

On the other hand, rubber swells when oil inks are used, and certain special inks are required to reduce the swelling to a minimum. As yet, halftones, except very coarse screen, cannot be printed successfully in long press runs.

It is in the field of book printing that rubber plates offer the greatest promise for the present. Books have never been printed from the speedy rotary presses, as large newspapers have. They are usually run off on flat bed presses. Because rubber plates can be curved without distorting the type faces, they may make book printing on rotary presses practical. Scribners' Press recently printed the first book from rubber plates in the United States, "The Emerald Murder Trap."

"Elastotypes" are made from any original form such as type, electrotypes

or linotype. First a matrix is made in an extremely accurate molding press from a sheet of thermo-active material, under carefully controlled temperature. The making of this matrix, which is inert, infusible, and not affected by age, heat, cold, or moisture, takes about ten minutes.

Then the matrix and a quantity of unvulcanized rubber are used to make the rubber plate in the same press under similar conditions. This takes about twenty minutes. When finished, the plate is removed from the matrix, trimmed to the proper size and mounted. In mounting, the rubber plates are attached to metal plates by an adhesive on the reverse side, protected by an easily stripped-off sheet of muslin exactly like a patch used on an old automobile inner tube. This can be done in one minute or less, making a saving in time and cost.

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PHYSIOLOGY

White Hair Turned Black; Cholesterin is Credited

WHEN the white-haired turn black-haired or auburn-haired or change to any other color of the spectrum, their cynical friends jump to the unkindly conclusion that the aid of dye chemistry has been invoked. This suspicion, it would seem, is not always justified.

A case that is singularly well documented has just been recorded in the journal of the Danish Medical Association by a physician who was not only himself the subject of the phenomenon he records, but who also invites his skeptical colleagues to come and see, to pinch and palpate, and to undertake whatever other test they like, within reason of course. His record of himself is as detached and impersonal as a personal record can be.

"For the past 10-15 years I have been white-haired, and I can stoutly affirm that at any rate for the past 5 years I have not had one dark hair on my head—apart from a quite narrow strip on the nape of my neck."

AERONAUTICS

Stratosphere Flight May Start From Scott Field

SCOTT Field, former site of the Army Air Corps training school for balloonists near Belleville, Ill., may be the scene of the next stratosphere flight of the National Geographic Society-Army Air Corps.

If it is decided to attempt another hop to the upper regions of the earth's atmosphere late this fall in the balloon Explorer II, Scott Field would be admirably suited to the take-off.

Its central location would make it more easily possible to reorganize the stratosphere expedition than at distant Rapid City, S. D. Moreover, facilities for handling balloon flights plus a highly trained ground personnel are additional advantages.

Preliminary surveys indicate that October is a favorable month. Further checks against the records of the U. S. Weather Bureau for the region are now being made.

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Mountain sheep are almost extinct in Washington and Oregon.

One day, he continues, he had his hair cut, and when he came to survey the barber's field of operation he was rather surprised to find some stray dark hairs between the white hairs on the top of his head. He had for some time been rubbing a 2 per cent. cholesterin ointment into his scalp with the object of keeping his white hairs on it; and he wondered if this modest objective might possibly have achieved something much more ambitious.

At all events, he had been given a clue and he decided to follow it up, although, as he dryly remarks, "it was far from my wishes, after having been white-haired for so many years, to become dark-haired again or even merely grey-haired."

He proceeded therefore to rub the ointment into his scalp twice a week. After he had done so for three months, he found that the proportion of dark hairs to white was about as one to four.

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ENGINEERING

Auto-Rail Bus Travels Roads And Rails with Equal Ease

WOULD you be surprised if the railway locomotive hopped the tracks at the station some hot afternoon, sped down Main Street and stopped by the corner drug store to deliver a dozen crates of lemon soda? Sunstroke? Not at all—

An American counterpart of the combination automobile and rail car developed abroad promises to aid the railroads in meeting competition of non-rail vehicles. Manufactured by the Evans Products Company, Detroit, and tentatively known as the auto-railer, it is now being tested by a number of railroads in the United States as a possible solution for some of their problems.

Permitting operation on both highways and rails, the auto-railer attachment can be installed on any standard make of bus. Flanged pilot wheels of steel held in position by compressed air keep the rubber tires on the rails. By use of levers, the operator of the vehicle can convert it from rail car to bus and back again at will, in a moment.

Rubber tires make the operation silent and easy riding in either capacity. Pick-up or quick stop on the rails with rubber tires is superior to steel on steel, according to engineers.

Store door pick-up and delivery in outlying districts could be effected without rehandling of the load. This would mean

lower freight rates, through exploitation of the expensive railroad right of way and avoidance of handling costs.

Since long before the depression the railroads have increasingly felt the competition of bus companies and automobile hauling agencies. Railroad executives and stockholders complain that the competition is unfair because the railroads must expend millions yearly for upkeep of rails, signal towers, and other equipment while the bus companies use the public highways for nothing. Furthermore, they are forced to maintain rates and schedules, even if unprofitable, in contrast to the ability of the bus companies to arrange their own rates and schedules.

The diverting of a large portion of heavy bus and truck traffic from the intercity highways would reduce congestion and lessen the high yearly total of fatalities from motor accidents, it is claimed.

Passenger rates might be lowered, engineers say, because the amount of dead weight per passenger pulled by the railroads would be reduced if the light auto-rail car came into use. At the present time a train pulls about one and one-fourth tons of dead weight for every passenger. The light auto-bus would reduce this weight to the neighborhood of 350 pounds.

A somewhat similar vehicle used in

Austria is 73 feet long, streamlined, and has a top speed of 93 miles an hour. French and English and German railway engineers are experimenting with similar types.

First use of the auto-rail car in America would probably be in reviving dying and now unprofitable railroad-branch lines, rather than on main lines.

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MEDICINE

Epileptics Seem Cured After Brain Operation

APPARENT cures of epileptic patients by surgical removal of the affected part of the brain in 25 cases were reported to the Second Neurological Congress, London, by Dr. Wilder Penfield, American physician who is professor of neuro-surgery at McGill University, Montreal.

Whether the cures are complete and lasting can only be ascertained after the subjects eventually die, Dr. Penfield pointed out, because a recurrence is always a possibility.

Some of the cases, however, have been without convulsions for six years.

In 75 operations for this affliction only two patients have died as the result of the operation, Dr. Penfield said.

Brain surgery is not suitable for all types of epilepsy, the Montreal physician indicated, but works well in cases due to focal atrophy and brain scars.

Brain scars may be acquired at birth or by injuries such as local meningitis and may precede the onset of epilepsy from one to 15 years.

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ENTOMOLOGY

Giant Toads Combat Hawaiian Insects

GIANT toads with even bigger voices are being raised by scores of thousands to clean up the insect pests of Hawaiian sugar plantations and other cultivated fields. The same toad species some years ago effected a spectacular rescue of Puerto Rican plantations from the destructive white grub plague, and the ancestors of the present Hawaiian toad armies were brought to these Pacific islands from their home in the West Indies.

The giant toad, named *Bufo marinus* by zoologists, has a body six inches long and a voice that fills the sky at night. However, he sings only when he can get his hindlegs into water, so that people who do not care for his serenadings easily keep their premises quiet by putting 15-inch fences around their garden pools.

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RIDES RAILS AND ROADS

Hybrid vehicle that may solve problems now perplexing railroads.

ORNITHOLOGY

**Study California Condor,
Nearly Extinct Giant Bird**

THE California condor, most gigantic bird that flies, is nearly extinct, but there are probably more specimens of the bird still living than recent estimates have stated. This is the opinion of Ernest I. Dyer, ornithologist of Piedmont, Calif., who recently went with a party of observers into the "condor country" of the south-central California Coast Range to check up on the surviving numbers of the birds. (*The Condor*, Jan.-Feb.)

Ten, was a recent estimate of the number of California condors still living. On at least three occasions Mr. Dyer and other members of his party saw seven condors in the air at one time; and he regards it as quite unlikely that 70 per cent. of the California condor population of the world would be thus concentrated at a given moment.

One of the aides of the party, a "hoss wrangler" who knows the country thoroughly and has the reputation of reliability, declared on one occasion that there were eighteen condors in sight, seven in the air and eleven on the ground, feeding. Two of the birds observed were young.

Dr. Dyer stresses the danger of early extermination that threatens the California condor, especially since there are unsportsmanlike hunters who are apt to shoot at the birds for nothing more than the fun of shooting.

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PSYCHOLOGY

**Workers in Movies
To Improve Efficiency**

UP-to-the-minute factories now are putting their workers in the movies. The films are not of the Hollywood variety and may never show in your neighborhood theater, however. They are used by efficiency experts to study the movements of workers on the job. And incidentally they serve to convince workers of the importance of eliminating waste movements.

Use of the new technique for reducing factory fatigue and increasing output was described in a report to the International Congress for Scientific Management, meeting at London. The report was presented by a subcommittee of the American Society of Mechanical Engineers.

"Before and after" films—films showing the methods employed in other industries before and after the introduc-

tion of motion study—are used to break down the resistance usually encountered in any organization when suggesting new and improved methods. A film is then taken of the operation in that particular plant, and very quickly the operatives begin to offer suggestions for improvement. When the new method is in operation, another film is taken to act as a spur to continued effort and to stimulate others in attacking their own problems.

Of the improvements which have been brought about by this method, one was better seating arrangement—special chairs and foot rests being introduced in one instance. Better lighting was also studied. The inspectors experimented with different colored work-places to reduce eye fatigue. In one unit a pale blue color provided the best contrast to the black articles handled by the workers.

Suggestion books were kept in which the employees were encouraged to set down their suggestions, many of which were ultimately adopted. In one small plant over 500 motion-study suggestions were received in less than a year, and an unusually high percentage are already in operation.

Science News Letter, August 10, 1935

EDUCATION-PSYCHOLOGY

**Figures "Survival" Chance
For High School Students**

MATHEMATICIANS of life insurance companies compute life tables which can show you your chances of survival at any age.

Now an educator has computed such a table showing the chances of a boy or girl for survival of high school studies, based on mental age.

Tell me the boy's intelligence quotient (mental age compared with chronological age), says Dr. Claude Mitchell, superintendent of schools at West Newton, Pa., and I can tell you what are his chances for flunking in English or algebra. Here is his table:

IQ over 100—Chances for passing in English, 12 out of 14; chances for passing in algebra, 19 out of 20.

IQ 80 to 100—Chances 1 out of 2 on English; 1 out of 3 on algebra.

IQ 75 or lower—Chances zero on both subjects.

Similar tables could be set up showing chances for high school graduation, Prof. Mitchell indicates. Of the students with IQ's above 98.8, only 9 per cent. drop out before graduation, but of those below this average grade 55 per cent. do not complete the course.

Science News Letter, August 10, 1935

IN SCIENCE

COMMUNICATION

**Radio Stations Will Link
Afghanistan to World**

THE MOST powerful of five new wireless stations for communication within Afghanistan and with the capitals of the world will be erected at Kabul shortly. The other four will be situated in important positions throughout that inland country between India and Persia.

Outfitted with a short-wave transmitter suitable for telegraphy and telephony, and two receivers, the Kabul station will reach all the capitals of Western Europe with ease. Regular communication with New York, Shanghai, Tokyo and Moscow will be established, as well as with Rio de Janeiro, Cape Town and Melbourne.

A central telegraph office for control of the wireless stations will be set up ten miles from Kabul, where the transmitting and receiving sites will be located. The latter will be separated, for more efficient operation, and equipment to reduce atmospheric interference will be used in the receiving station.

Science News Letter, August 10, 1935

GEOLOGY

**Gold Found in Petrified
Forest Area in Nevada**

GOLD HAS been discovered in Churchill County, Nev., but not in sufficient quantities to cause a gold rush, according to a report by Prof. W. S. Palmer of the Mackay School of Mines, Reno, Nev. (*Engineering and Mining Journal*, July.)

Unfortunately for would-be prospectors, the gold is found in logs of petrified wood, now changed by time and Nature into crystalline and chalcedonic silica, carbon, and calcite. The petrified forest area is 500 yards square, surrounded by rocks of volcanic origin, and gold has been found in only a part of the logs, which differ widely in gold content.

Spaces between the quartz crystals contain the irregular and crystalline gold grains, most commonly occurring in individual crystals shaped like cubes, octahedrons, and dodecahedrons. The largest gold crystal found so far is 0.16 inches in diameter.

Science News Letter, August 10, 1935

EN FIELDS

PSYCHOLOGY

Alcohol and Auto Driving Do Not Mix, British Find

ALCOHOL and automobile driving do not mix, is the verdict of the committee of the British Medical Association formed at the recent request of the Minister of Transport, Leslie Hore-Belisha.

The fifteen members of the alcohol study group found the three principal objections to even moderate use of alcoholic beverages before or during driving were: (1) Too many risks taken. (2) Traffic decisions made more rapidly. (3) Such decisions made less judiciously than normally.

The committee's verdict was based on a study of previous researches, including American and British tests indicating that there was a slowing down of eye, leg and hand movements and lack of coordination between the three after small doses of alcohol.

Hand coordination and motion were checked by measuring the increase in the number of errors in typewriting after the test alcoholic dose.

Science News Letter, August 10, 1935

PHYSICS-MEDICINE

"Radium Hen" Finds Lost Cancer Therapy Needles

THE HEN that finds lost radium is a more valued possession than the goose that lays the golden egg—to a modern hospital, at least.

For golden eggs come cheaper than radium, a modest price for which is \$50,000 for a single gram.

The "radium hen" (*Journal of the American Medical Association*, Aug. 3) is really an instrument developed in the National Physical Laboratory in England. It gets its name from the clucking sound it makes when placed near radium. The nearer it approaches the valuable element, the more rapidly and excitedly it clucks.

Hospitals occasionally, in spite of extreme care, lose or mislay radium "seeds," the tiny gold needle-like containers inserted in the body in cancer therapy.

Every now and then one gets washed down the sink. Now the "radium hen" leads quickly to the point in the pipe where the needle is lodged.

The instrument looks somewhat like a garden syringe, but behind its brass-cased head are a neon lamp and a trail of flexible cable leading to a box of high tension batteries.

The neon glows when the electric pressure is sufficient to cause a discharge through it. The pressure is adjusted so that the lamp just misses lighting. The radium radiation pulls the trigger, so to speak.

As it is sensitive to daylight, the lamp has to be covered, and therefore cannot be used as an indicator. An electric current flows through the lamp when it is lighted and the current is converted into sound either by use of head phones or a loud speaker, which clucks in correspondence to the flashing of the hidden lamp.

Science News Letter, August 10, 1935

AERONAUTICS

Airships in Gusty Air Flung Downward Violently

THE BATTLE between cold polar air masses and the warm air from tropical regions can create violent disturbances in the earth's atmosphere which may make objects fall one-third faster than the drop due to the normal attractions of gravity, it was revealed to aeronautical scientists gathered for the first American lighter-than-air craft forum at the Daniel Guggenheim Airship Institute at Akron, Ohio.

The increased acceleration due to weather forces applies to all falling objects, but what interested the airship experts was the application to lighter-than-air craft and the problem of the airship's future in America.

Dr. A. M. Kuethe, of the Airship Institute, described the weather forces in explaining a six months' study of what happens when cold air moving down from Arctic Canada mixes with warmer air coming north from the tropics and makes the weather of the temperate zones.

In the ideal case, Dr. Kuethe said, a cold air mass overrides a warm air mass and there is a consequent overturning which regenerates strong gusts.

Using recording instruments on a broadcasting tower nearly 300 feet high and small balloons for higher altitudes, the airship institute scientist found accelerations as much as one-third that of gravity frequently occur in these cold front zones.

Science News Letter, August 10, 1935

BOTANY

Almost Invisible Light Can Retard Plant Growth

A NEW and unsuspected link in the relationship between light and biological activity has been discovered by Dr. Lewis H. Flint, of the Department of Agriculture, and Dr. E. D. McAlister, of the Smithsonian Institution. Discovery that a band of light waves at the red edge of the invisible in the spectrum has a powerful retarding effect on plant growth was announced as the result of their studies.

Lying at just about the point where light can no longer be seen by the human eye, the band's growth-retarding action had not been suspected or looked for, although previous studies by Dr. Flint had disclosed the effects of certain light waves on plant growth. Red, orange, and yellow light caused lettuce seeds used in the test to germinate, while green, blue, and violet light caused germination to lag. The effect of this inhibitory invisible light band seems to be more powerful than the entire green-blue-violet end of the spectrum, although not tested as yet on other plants beside lettuce seeds.

Fortunately for trees and plants on the earth, solar radiation of these growth-retarding light rays is reduced by its absorption in oxygen of the sun's atmosphere, and in water vapor of the earth's atmosphere.

Phototropism, or the well-known bending toward the light of plants, is now explained by scientists as being the result of unequal growth on different sides of the plant shoot, due to effects of different bands of light waves.

Science News Letter, August 10, 1935

ENTOMOLOGY

Guatemalan Wasps Fight Cane Grubs in Hawaii

DESTRUCTIVE grubs that eat the roots of Hawaii's sugarcane crop have gained a new enemy in a species of small wasp which has been imported from Guatemala, by way of California, to fight them. The wasps lay their eggs on the undersides of the grubs, and the larvae that hatch out feed parasitically on the grubs, destroying the destroyers.

The original stock of wasplets was transported to Los Angeles from Central America by airplane, bred for a season on carefully nurtured cane grubs, and the second generation thus obtained shipped to Hawaii by fast steamer.

Science News Letter, August 10, 1935

ETHNOLOGY

People Without Magic

**Only Group in the World Free From Superstition
Is Found Not in Civilized Lands But Among "Savages"**

By EMILY C. DAVIS

EVEN men in the highest of silk hats and women wearing long-handled lorgnettes can't afford to look down on benighted savages, thinking them "so ridiculous" because they make magic to get what they want.

For the fact is, scientists can find magic the world over, except—

Except where? Well, they don't say "except in American cities," not with all the appeals to Lady Luck, and pet superstitions and mascots that they can observe on Main Street and Broadway. Certainly those are magic, say the scientists.

Forcing Nature

Trying to force nature to make your wishes come true, that's magic; and there is a feeling of awe that seems to be an essential part of magic, because it deals with forces that are outside the pale of good sound common sense. So, choosing a particular, lucky number for your automobile tag is magic, just the same as the charm that the islander mumbles in the cheery hope that it will remove an enemy from his path.

If you want to get away from magic, you have to get entirely away from civilization. Take ship for the Philippine Islands, and ask for the pygmy Negritos up in the mountain province of the island of Luzon. These little chocolate brown people are wild and backward. Live in houses scarcely bigger than dog tents. Eat what they can find hunting and fishing. And work no charms to get ahead of nature.

Dr. John M. Cooper, anthropologist of the Catholic University of America, believes this pygmy people to be unique. The discovery that any human beings alive let nature alone and do not try to get the upper hand by magic trickery is surprising to scientists no less than laymen.

The discovery, Dr. Cooper explains, was told him by Father Morice Vanoverbergh, scientist and missionary from the Philippines. This man had been living 30 years among Philippine natives who would jump even if a leaf blew down the floor, fearing that it boded some evil mystery. From these magic-fearing people, he went to visit among the mountain

pygmies. Knowing that the pygmies were a step farther down the scale of civilization, he was prepared to find them conjuring about everything.

But no; a leaf rolling along the floor is just a leaf to these little savages. Sickness? Nothing mysterious about that. You get sick, that is all. The whole world to these simple people is as matter-of-fact as that.

Luck? Fairies? Magic? Their talk and their doings hold not a trace of it.

Thus anthropologists, who study Man with a capital M and impartially compare Philippine pygmies with college bred Americans, are overturning popular notions about magic. Civilized men, not to mention their wives and children, make magic. Some of the most backward humans alive do not.

The matter-of-fact pygmies may give the modern world a clearer glimpse into the long-ago world of the Stone Age cave men, it is believed. Valuable clues to a cave man's thoughts can sometimes be found by probing the minds of the most primitive living races. After all, some of them are still living in the Old Stone Age, whatever the calendar says.

Caveman's Art

Finding a tribe without magic, and a very simple tribe at that, strengthens Dr. Cooper's theory that the cave man's famous art may not have been produced as savage magic.

Popular opinion has been rather unfair to the cave man on more than one count, Dr. Cooper fears. The cave man is notorious as a creature who was rough with his women folk, and who painted excellent animal pictures for the silly idea that they would help him kill real beasts in the forest.

Explaining the cave man's art on this uncomplimentary ground is quite customary. The spirited wild horses and mammoths painted on cavern walls in France and Spain are ordinarily pointed out as the "sympathetic magic" of 30,000 years ago. It is supposed that the cave artist would paint the animal, draw a dart through it, or gouge holes to represent wounds, and then perhaps with a few words of hocus pocus he would conjure the picture into reality for the next day's hunting. So the pictures are ac-

counted for, because natives today perform sympathetic magic very similar. Hex doctors in America put faith in the same sort of magic, using wax images and pins, for instance, to imitate the hoped-for destruction of an unwanted person.

But about the cave man's motives, both in love and art, Dr. Cooper has remained very, very skeptical. He questions whether magic had been invented by our ancestors in cave man days. And finding that the simple pygmies have no thought of it, is the first good evidence that magic is not universal.

If cave men wanted to paint the world's first pictures, they may have been doing nothing more mysterious than the small boy when he idly draws houses, cats, and school teachers on the back fence. Art for art's sake, by this view of the past, would be far older than has been supposed.

30,000 Years Ago

Cave men may not have begun to play with the dangerous fire of magic. But they did have science, practical applied science, 30,000 years ago.

There is evidence for this, Dr. Cooper points out, in the stone tools and hunting weapons which they worked on and improved. That was workaday, laboratory science based on observation and reasoning.

The general view that modern science has sprung up out of the roots of magic is not shared by this anthropologist. It is all wrong to think of ancient astrology's weird star lore turning into the exact science of astronomy. Nor did the trickery of medieval alchemists presently sober down into modern chemistry.

On the contrary, science began as science, says Dr. Cooper. The simplest savages had some knowledge of science, and have it today. Magic simply chiseled in, became a parasitic growth on real scientific knowledge.

The civilized world, with its superiority complex, has never given savages credit for their scientific knowledge. But anthropologists who get to know them report that primitive men and women possess some working knowledge of every major science, from botany to zoology. Not all of primitive science is valid, of course. The jungle anatomist makes mistakes and gets wrong ideas. But not all the science of the most complex modern laboratories is valid either, so far as that goes.

To show what the so-called savages achieve in science, Dr. Cooper cites the case of a Zulu girl in South Africa who brought in botanical specimens to a visiting white botanist. This girl, about fifteen years old, collected nearly 900 specimens of plants and she knew the names and uses of practically all of them. And there was no magic about this, no awe of mysterious properties of plants. Just matter-of-fact observation.

An Indian of the Hudson Bay region explained to Dr. Cooper in considerable detail how the caribou's four stomachs are used. He described the processes of digestion in this rather intricate animal, and Dr. Cooper remembered and looked it up when he returned home. Not being an anatomist or a Canadian woods Indian, he wondered how much truth there was in the Indian's explanation, but it turned out to be scientifically correct.

Storm Waving

Not so successful is the science of the African tribe which tries to wave a storm away by violent arm motions. Cattle can be driven off by this sort of arm waving, so why not a storm? This seems to be the reasoning of the Africans. It is poor science, but not fair to call it magic, says the anthropologist.

Superficial travelers, and their public back home, have rather enjoyed shuddering over the dreadful magic-ridden lives of the uncivilized. That is why magic has loomed so big and important in tales of jungles, woods, and tropic isles. Think of putting your trust in witch doctors, swallowing potions brewed of awful ingredients, and being alert every second to invisible, mysterious danger. A terrible life, surely, filled with fears and superstitions, but fascinating to consider.

"Primitive man magic-ridden?" says Dr. Cooper with a thoughtful smile. "I am not so sure of that, so far as *very* primitive man goes."

"Travelers and explorers tend to emphasize the stupidities and superficialities of savage life," he explains. "It is these stupidities and superstitions that have usually most news value. But in reality these things are a small part of thought or activity in a primitive camp or village. In their affairs of hunting, eating, caring for the children and their homes, the savages are apt to be as matter-of-fact as Main Street itself, and, more commonly than not, show considerably more intelligence than is shown on that much-advertised thoroughfare."

Magic is just about as important in a modern city as in a savage community, Dr. Cooper finds from living with neighbors of both kinds, primitive and civilized.

The town grocer or banker will tell you he does not really put any faith in superstitions. But he will, perhaps, smilingly admit carrying a lucky piece in his pocket—had it for years, he will say. Or he will mention wearing a certain blue necktie when he sets out for an important golf match. And his face will take on a slightly startled look when he finds himself with twelve other people drawing up to a luncheon table.

"Oh, just a joke," says the civilized man, laughing heartily, if such attitudes are mentioned.

Well, says the anthropologist, primitive men are just joking about their superstitions, too, many a time when they tell foreigners about them. Many observers have made the error of writing down primitive humor under the sober heading "native beliefs." The joke seems to have been on the civilized investigators, not on the simple savages who are supposed to believe such ridiculous things.

In the Canadian woods around Hudson Bay, where Dr. Cooper spends his summers, he finds magic taken in all degrees of seriousness, just as it is back home in Washington, D. C.

An Indian will tell him, with a straight

face, a long story of how the bear lost its long tail. It seems a fox tricked the bear into fishing through the ice with its tail, got the tail frozen in the ice, and so the bear lost it.

Watching the Indian closely, the anthropologist can catch a twinkle in his eye, and knows that he is hearing a funny story. No bear and fox ever talked each other into any such situation, and the Indian knows it as well as you do.

When an Indian remarks that his mouth is twitching and he is "going to eat fat," he is half-jesting about it. It is a sign, and there is no harm hoping for a good dinner. And that matches up with the civilized man's saying "My ear is burning; somebody is certainly talking about me."

Grease Gazing

From such jokes and half-jokes, magic can be found grading on up to highly serious matters. Indians of this same Canadian forest do a sort of crystal gazing, using the shiny surface of otter grease in a pan for a crystal. If the gazer looks in and sees his face with the eyes seeming closed, it is a terrible sign, so bad that the gazer will not talk about it. Premonitions are taken just as seriously in much more cultured circles by some people, as everyone knows.

So far as anthropologists can make out, magic is just a side line in the everyday life of a savage of the simpler sort. It is just a side line with civilized man. Savage and civilized humans both live about ninety per cent. on the work-a-day level, with common sense telling them what to do. It is more among the middle-grade people, the semi-civilized tribes, that magic is a pervading influence. There magic has chiseled in with a vengeance.

The idea that natives almost everywhere are perpetually in awe of the supernatural and always busy conjuring to defeat it, got abroad in part as a result of Australian discoveries, it is now realized. Australian natives were among the first to show the world what primitive customs were like. And the scientific studies there revealed a good deal of picturesque magic. But far from being typical simple savages, the Australian natives are becoming more and more recognized as having a complex and advanced native culture. They have one of the most complicated marriage systems in the world; instruct their boys in elaborate dramatic ceremonies; and are ruled by a powerful council of elders.

These black men of central Australia are magic ridden if any people are. Any man who dies, except in battle, may be thought killed off by magic arts. Then the enemy responsible has to be sought,



NOT SUPERSTITIOUS

Negrito woman, "four feet plus," and not afraid of spirits. This pygmy tribe is believed unique in the world, since magic has been found everywhere else, high and low. This photograph is from the collection of the U. S. National Museum.

by more magic. Magic is used to bring an eloping wife back to her lonely husband. Magic has power to bring rain, and to cause animals to appear.

But understanding the Australians is no neat guide to understanding native life. It now appears that explorers who reasoned that all natives act like Aus-

tralians have been as wrong in their science as the Africans who earnestly try to apply cattle-handling devices to control thunderstorms.

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Science News Letter, August 10, 1935

AGRICULTURE-ENGINEERING

Invention Still Has Task Of Freeing Small Fingers

GRAIN harvesting machinery is whirling on a million farms, and when the fields have been cleared tractors will pull plowshares through the soil, preparing it for fall sowing. Machinery has lifted much of the load that used to wear out men's backs and arms on the farm, just as machinery in factory and on the city street has liberated urban workers—though often at the cost of a period of distressful "technological unemployment."

But there still exists a great need for further invention that will liberate the fingers of children, bound to such slave-labor tasks as hand-weeding onion fields, thinning sugarbeet rows, picking cranberries in the bogs. Ordinary farm chores may be no great hardship on children; they may even reminisce about them in later years, as Herbert Hoover did not long ago about his exploits as a youthful potato-bugger. But gang labor by children, on corporation-owned industrialized plantations, is quite another story. There can be sweated work in the fields as well as in the factories.

Yet if we would do away with this nasty remnant of slavery, we must fairly face the growers' dilemma. The public demands cheap onions, cheap sugar, cheap berries. All these crops, and others, require much nimble finger-work. The grower must either exploit children or raise prices—and face a buyers' strike that may force him out of business.

The alternative is liberating invention, analogous to the invention of nail-making and chain-making machinery, which released thousands of child-slaves who once sweated and starved in the light ironware trade of England.

Admittedly, machinery for finer manipulations is hard to invent. A gang-plow that will rip up soil by the ton is easier to think up than a device that will pick raspberries and pass by the leaves and twigs, or a machine to pluck up tiny weeds and spare the young onions. But

if we are to ease our social conscience of our present economically dictated sins against childhood and yet redeem certain businesses which we insist on retaining, such devices will have to be produced.

There may, of course, be non-mechanical solutions for some of the problems. Conceivably, there might be some soil treatment, by heat or chemicals, that would destroy all weed seeds before a crop is planted, doing away with the need for hand weeding. Greenhouse and nursery-bed soils are now heat-treated, to kill disease-fungi before tobacco and tree seeds are planted. But if such methods are attempted, they must be made much cheaper than they are now. Furthermore, harm must not be done to the soil itself, and to the useful microorganisms that live in it. The children must be emancipated, but we must be careful lest we set them free into a breadless house.

Science News Letter, August 10, 1935

ANTHROPOLOGY

Bones of First Americans Are Still Missing

SEEKING the first inhabitants of America, whose skeletal remains have not yet been discovered, Edgar B. Howard of Philadelphia is now on his way to Russia.

The hunt for information regarding these earliest Americans is being extended to Siberia, whence they came, following five years of extensive exploration by Mr. Howard which have failed to show any of the secret burying places in this country.

"Folsom Men," as the oldest people of the American wilderness are scientifically termed, are known to have existed, from the trail of their stone weapons and bones of extinct animals they hunted and ate. Mr. Howard's explorations, which are conducted for the Academy of Natural

Sciences of Philadelphia and the University Museum, have furnished evidence that these hunting people were in America long before the Basket Makers—oldest known Indian culture, which dates from about 2000 B. C.

Not satisfied, however, with his conclusion that man lived in America at least 10,000 years ago, Mr. Howard has urged that "what is most needed is to find Folsom Man himself."

In Russia the American archaeologist expects to examine fossil finds that have been made in Siberia, and possibly to enlist the active interest of Soviet scientists in further work along these lines.

If Folsom Man continues to prove personally elusive in America, it is hoped that his physical type and other important facts about him can be detected among remains in his old home land in Siberia.

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ENTOMOLOGY-PHARMACY

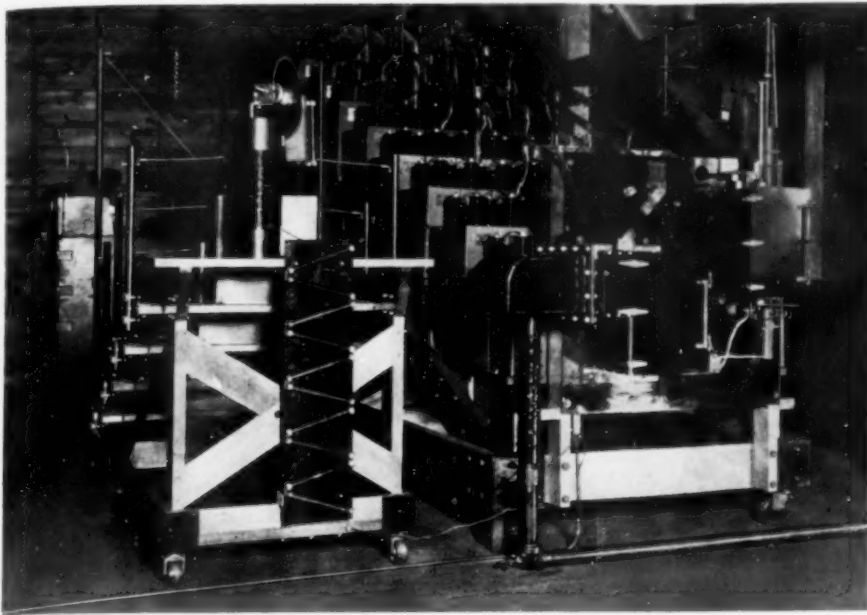
Preferences of Drug Store Beetles Subject of Study

"DRUG store beetles" are replacing "drug store cowboys" as the principal pests and annoyances of the corner druggist. That is one way of putting the conclusions of the Department of Entomology of the Oregon State Agricultural Experiment Station, after making an extensive study of beetles and bugs found in pharmacies. Particular attention was paid by the entomologists to determining the drugs preferred by the marauding insects for their repasts.

The investigators were unable to say whether two particularly greedy species, the drug store beetle and the square-necked grain beetle, nibbled on sleeping powders after a night of "whoopce" on sarsaparilla and ginger roots. They did find that both preferred crude drugs containing an abundance of sugar in their rhizomes or roots. The taste of the drug seemed to make little difference in most cases, although a few of the tasteless drugs rather seemed to be favorites.

The two species differed in their likings. Out of the twenty-two drugs which were found infested, the drug store beetle seemed to prefer, among other less common drugs, the roots and rhizomes of the sarsaparilla, the male fern, meadow saffron, burdock and licorice. The square-necked grain beetle found rhubarb rhizomes and ginger roots more to its liking, while they both seemed to fancy the iris rhizomes and the bark of the burning bush. Other well-known drugs were tabulated in the report, such as chicory, caraway seed, parsley root, linseed and ginseng.

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SILENCER FOR LIGHTNING

MEDICINE-CRIMINOLOGY

Would Criminal Become Leper To Change His Fingerprint?

WOULD a desperate criminal be willing to contract leprosy in order to escape the law?

Dr. Leonidio Ribeiro, director of the bureau of identification in Rio de Janeiro, Brazil, has made public research which raises this question for crime detectors. He gave convincing proofs, with photographs, that finger prints of persons with leprosy change so greatly from what they were before the illness that they are useless for purposes of identification.

Dr. Ribeiro's investigations were carried on in the colony for lepers in Curupaity, Jacarépaguá, Rio de Janeiro. Of two hundred cases examined for his report, 80 per cent. were found to have changed finger prints after the onset of the disease. The number examined included both men and women. In non-leprosy persons white streaks were found in 10 per cent. of those investigated. In lepers he found that 70 per cent. had these white lines. These lines so changed the papillary pattern that the prints no longer made identification by the finger print method possible.

It is estimated that there are over five million lepers in the world. In this leper population there may be many thousand criminals who, if their crimes were committed before the onset of their disease,

could never be identified by their finger prints.

Two other diseases, scleroderma, which is not contracted at will, and radio dermatitis, an industrial disease, also change the finger prints to a marked extent. These diseases have already been taken into consideration with suspects known to have these ailments.

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NEUROLOGY

New Kind of Pain Due to Chemical Tissue Changes

A NEW KIND of pain resulting from chemical changes in tissue surrounding nerves was described before the Second International Neurological Congress meeting at London by Sir Thomas Lewis, fellow of the University College, London, and member of England's Medical Research Council.

The more usual type of pain arises when the nerve endings are stimulated by direct physical contact.

Sir Thomas cited experiments showing that malnutrition or injury of tissues may cause chemical changes which stimulate the sensory nerves and bring pain.

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ENGINEERING

Artificial Lightning Now Without Deafening Noise

See Front Cover

COMplete lightning phenomena can now be produced in comfort in the laboratory. One artificial 100,000-ampere lightning stroke produced in Westinghouse's Sharon, Pa., testing laboratories caused spectators to hold their ears to shut out the thunderous noise, as shown on the front cover of this week's SCIENCE NEWS LETTER.

Engineers have developed a muffler, however, which shuts out the noise and allows observers to stand close to the lightning current generator while it is operating.

Tests in the laboratory during the past three months showed engineers the futility of conventional protective apparatus and brought out the ability of the "deion gap," a device for "snuffing out" lightning currents, to protect against even direct strokes of lightning.

Science News Letter, August 10, 1935

EDUCATION

Care of Blind Children Is Outlined for Parents

A BLIND child eight years old who has had no previous training is almost hopelessly late."

Hopelessly late for what? To be started on the road to normal associations with seeing people.

This sharp warning is issued by the Canadian National Institute for the Blind, in its efforts to induce relatives of blind babies to give these children a fair start in life, and to lose no time making that start.

The printed instructions that the Institute offers to the parents of blind children are impressive, even for the casual reader to glance over. They are "common sense," and simply told. Yet, there is no doubt in the world that thousands of households with blind babies in them would never think of some of these important things to do for their handicapped children.

Giving the blind baby his good start includes such items as these, taken from the Canadian instructions:

Teach the child to walk at the same age as you would the seeing child.

As soon as possible teach the child to dress and undress; to wash himself; to comb his hair; to take care of his clothes; and, when at the table, to use properly a spoon, fork, and knife. A blind child should do all these things

as well as a seeing child; but you must be patient and give the child much practice in doing such things because he can not learn by observation.

Watch carefully the child's personal appearance and bearing. He can not see how others act and so readily acquires habits which are disagreeable to his companions. Some of the most common mannerisms of blind children are rocking the body, twisting the head about, sticking the fingers into the eyes, distorting the face, swinging the arms, shaking and hanging the head in walking, and bending over in sitting. As soon as you observe such practices in your child, you should set yourself with patient determination to break them up, and with gentleness and firmness to rectify them. Once they become habits, years of schooling will not undo the mischief.

Allow the child to take part as early

as possible in household duties.

Speak with your child frequently, for, since he can not read the loving care which is written on your face, he has a special need of hearing your voice. Ask the child frequently what he hears and feels, and encourage him to ask many questions as to what is going on around him.

Take care what you say before your child, for the blind child is more attentive to all that he hears than the seeing child is.

Never express regret in his presence at his blindness. Never allow others to do so. Encourage him to be happy and bright and to do his work with spirit and pleasure in order that in later years he may become independent of outside assistance.

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ENGINEERING

Highways of Salt In Use Now In New York State

HIGHWAYS of salt are now being built as the result of the experiments of Dr. Cloyd D. Looker, research director of the International Salt Company of Ithaca. These "salt-soil-stabilized" roads are proving very successful as highways which do not carry a lot of traffic but which must be built and maintained at a low cost. In the "farm-to-market" type of road, where traffic does not exceed 500 cars a day, it is considered one of the cheapest and best methods yet devised to "get the farmer out of the mud."

A highly successful road of this type has been in use for the past two years to connect the city of Ithaca with its new airport. A temporary salt road was installed while the airport was in process

of construction. Thousands of loads of "fill" moved over this highway, which will shortly be hard surfaced to join a permanent artery of travel.

More than one method can be used in applying the salt. One way is to mix the salt with the road material by blading, meanwhile sprinkling water on to moisten the mixture, and then rolling it to a firm surface. Another method is to build the road up in layers, interspersing a layer of salt with layers of road material. The salt thus laid soon permeates the entire mass by capillary attraction. About 12 tons of salt are used to the mile of an 18-foot highway, or about two pounds per square yard.

The salt draws the moisture from the air and keeps the surface moist. At the same time it reduces the film of moisture around each particle of clay, so that the clay packs down to a harder surface. Not only does the salt compact the clay, giving a concrete-like surface, but it also crystallizes on the road surface and retards evaporation of water from the road, thereby keeping the material underneath in a moist condition. Once the crystallization has taken place, the road sheds water during a rain and does not become slippery or muddy. It resists traffic abrasion to a marked degree.

The cheapness of rock salt is one of the great virtues of the salt-stabilized

road. The highway can be built for around \$450 a mile, where \$1,500 is a minimum cost for a mile of asphalt road. Thus, by this method many roads can be surfaced which do not get enough traffic to warrant the expense of a hard surface finish.

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ETHNOLOGY

Discover Where Indian Maid Tricked Spaniard De Soto

THE SCENE in the American wilderness where a clever Indian girl "made a fool" of Hernando de Soto has been located by a modern exploring scientist following de Soto's trail.

Dr. John R. Swanton of the Bureau of American Ethnology announces that the celebrated incident took place "with high degree of probability" near Franklin, North Carolina, on the Little Tennessee River.

Here, the lady of Cofitachequi, Indian woman chief who was carried captive by the marching Spaniards, outwitted de Soto and even managed to take her trunkful of pearls with her in the escape.

The Indian, described by de Soto's secretary as a young girl of fine bearing, had come to greet the Spaniards riding in a litter covered with delicate white fabric. She had taken off her pearl necklace to present to the Spanish governor, and talked with him gracefully and at her ease. The fresh water pearls greatly impressed the treasure-hunting Spaniards, who explored and found quantities in the village buildings. When they moved along, the lady of Cofitachequi was carried with them, and one of her woman attendants bore a cane box, like a trunk, filled with unbored pearls.

But one day she slipped into a thicket off the road, carrying with her the attendant, pearls and all. And all de Soto's army, searching frantically, could not find her.

Dr. Swanton, well-known authority on de Soto's route to the Mississippi, picked up an ancient, well-marked trail which ran across steep mountain ridges to Franklin. Matching the narratives in various de Soto expedition diaries to the terrain, he located the probable site of the old Indian town of Xualla, mentioned in de Soto adventures, and placed the escape of the girl on the plain of Franklin. The location, he said, fits all requirements of the scene as described by the Spaniards.

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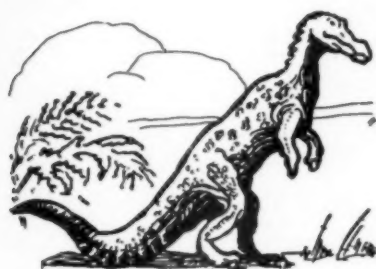
A ton of onions may yield no more oil than one-tenth of a pint, but that small amount is highly potent.

● RADIO

Tuesday, August 13, 3:30 p. m., E.S.T.
COLLECTING OLD HOUSES, by Dr.
Laurence V. Coleman, Director, American
Association of Museums.

Tuesday, August 20, 3:30 p. m., E.S.T.
WHY WE NEED BIRDS AND MAM-
MALS, by Dr. Joseph Grinnell, Profes-
sor of Zoology, University of California.

In the Science Service series of radio ad-
dresses given by eminent scientists over
the Columbia Broadcasting System.



Dinosaurian Devices

ONE OF man's cleverest inventions was anticipated, millions of years before his time, by the biggest (and about the dumbest) of beasts.

Did you ever see a pebble mill, or a ball mill? They are relatively simple but quite ingenious devices for pulverizing tough, fibrous substances, like animal tendons or stringy plant fibers, that resist the action of ordinary types of grinding apparatus. Such mills are much used in scientific and testing laboratories.

A mill of this type consists essentially of a tightly closable box, which can be rolled over and over by suitable mechanism. Into it are put the materials to be ground, together with a quantity of hard pebbles or hardened steel balls like ball-bearings. Over and over and over rolls the box, for hours, sometimes days. Within, the pebbles or balls are kept tumbling in an endless shower, bestowing millions of sharp impacts on the stuff that is being ground. At last, when the door is opened, out rolls the material, "digested" to a fine powder in this iron gizzard.

Exactly the same thing happens in the gizzard of a chicken or other bird, except that instead of rolling over and over, the organ grips and squeezes itself together with its thick, strong muscular walls. The food within is rubbed fine between the hard pebbles which the bird has swallowed, to make good its lack of teeth.

But long before modern birds, their relatives the reptiles had discovered the same trick. Modern alligators and crocodiles still carry a ballast of gizzard-stones; for though they are well equipped with teeth they do but little chewing with them. Their teeth are mere aids to catching and killing their prey, which is then gulped down whole, or in as large pieces

as the animal can swallow, and left to the ministrations of the gizzard-stones within.

Just so it apparently was with their distant cousins back in ancient geologic times. Some of the dinosaurs had teeth, others had few or none. But associated with dinosaur skeletons that have been found in favorable locations, where the big beasts apparently decayed and left their bones to be fossilized just where they lay down and died in the primal ooze, have been found "pecks of picked pebbles," often beautiful semi-precious stones, and almost invariably rounded with rubbing, which scientists think may very well have been their gizzard stones—equipment of the original pebble mills.

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BIOLOGY

Copper Wash Boiler Keeps Algae Out of Fish Pool

THE MARKET for second hand wash boilers should improve if the present craze in Ames, Iowa, for outdoor fish pools keeps up. One of the difficulties with the pools, especially during hot weather, has been the infestation with algae which gives them an undesirable appearance and odor.

One woman solved the problem by putting a copper wash boiler into her pool to hold cattails, the boiler being used to hold the dirt. The pool, which had hitherto been badly infested with algae, now is entirely free from them.

The effect of copper ions in the water on algae is well known to biologists, although for most purposes of algae control, as in water supply reservoirs, a small amount of a soluble salt of copper is added. However, the presence of a relatively large area of metallic copper in the water is sufficient to supply the low concentration necessary. Fish and the higher forms of plant life are not affected by the small amount of copper.

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MEDICINE

New Fatal Virus Disease Reported From Brazil

A NEW Brazilian disease with symptoms like those of polyneuritis and encephalitis was reported to the International Neurological Congress at London by Prof. A. Austregesilo of Rio de Janeiro.

The disease is an epidemic affliction of the nerves and is believed to be caused by a new virus, not before known to science. The common cold and infantile paralysis are but two diseases believed to be spread by virus action.

Prof. Austregesilo has observed many cases in Brazil in the last two years, he reported. The disease takes many forms and starts like a generalized infection with polyneuritis and apparently is always fatal.

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GEOLOGY

Geysers Wear Pebbles Down By Churnings of Eruptions

YELLOWSTONE'S famous geysers are all the time producing geologic specimens of a rare type, to which attention has been directed for the first time by Dr. Robert L. Nichols of Tufts College. (*Journal of Geology*, July 6.) These specimens are pebbles, fragments of common rock, but tumbled and pounded into rounded shapes by the rushing, swirling action of the erupting waters.

Besides having their edges and corners thus worn smooth, the pebbles are all coated with a deposit of the mineral geyserite during their stay in the geysers' throats. They are thus built up even while they are being worn down.

Dr. Nichols has found them most numerous in the neighborhood of Grand and Turban geysers, which are among the most active hot-water jets in the Park.

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•First Glances at New Books

Archaeology-History

THE STORY OF CIVILIZATION: I, OUR ORIENTAL HERITAGE—Will Durant—*Simon and Schuster*, 1049 p., 85 figs., \$5. Again Dr. Durant has produced a volume weighty to hold but entertaining enough to make the reader forget that fact. Babylonia had trial marriages; Egypt, its beauticians; China tried New Deal experiments; and the Assyrians used stink bombs. Keeping his account vivid and human, the author has woven for each civilization a large tapestry-like picture of its virtues and shortcomings, its struggles and achievements. This is the first of a series of five volumes planned by the author.

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Exploration

THE CONQUEST OF THE NORTH POLE, RECENT ARCTIC EXPLORATION—J. Gordon Hayes—*Macmillan*, 317 p., plates and maps, \$4.50. A companion volume to the author's "The Conquest of the South Pole." That well-known Polar exploration during the past 25 years is not being merely rehashed is vouched for by the statement: "The first account in English of several expeditions will be found here, and as a large proportion of the whole story is very little known it may thus possess the charm of novelty." The expeditions are described with much detail of facts, thereby increasing greatly the book's reference value.

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Entomology

APPLIED ENTOMOLOGY—H. T. Fernald—*McGraw-Hill*, 415 p., \$3.50. Third edition of a well-known and successful textbook, brought up to date by the inclusion of material on recently introduced species, new control methods, etc.

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Engineering

JONES' ESTIMATING TABLES ON AIR REQUIREMENTS AND DUCT SIZES FOR HEATING AND AIR CONDITIONING—*Domestic Engineering Publications*, 68 p., \$2. Tables for use by heating and air conditioning engineers.

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Medicine

STATE HOSPITALS IN THE DEPRESSION; A SURVEY OF THE EFFECTS OF THE ECONOMIC CRISIS ON THE OPERATION OF INSTITUTIONS FOR THE MENTALLY ILL IN THE UNITED STATES—Paul O. Komora, Mary A. Clark and Ralph A. Pierson—*National Comm. for Mental Hygiene, Inc.*, 126 p.

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Education-Engineering

THIRTY YEARS OF EDUCATION PIONEERING—Herman Schneider—*University of Cincinnati*, 32 p., free. Send 10c handling charge, if requested through Science Service. A brochure giving the history, experience and philosophy of the cooperative system of engineering education as practiced at the University of Cincinnati for three decades.

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Hydraulics

CURRENT HYDRAULIC LABORATORY RESEARCH IN THE UNITED STATES—*National Bureau of Standards Bulletin No. 111-2*, 86 p., free. Current projects in this country and abroad are listed, and abstracts and references to completed abstracts are also given.

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General Science

SCIENCE AND CULTURE: VOL. 1, No. 1, JUNE, 1935—Published at 93-A, Dhurrumtolla St., Calcutta, India, Monthly, 61 p., illus. Subscription per year, 12 s; single copies, 1 s. A new journal devoted to the natural and cultural sciences, particularly of India. Discussing application of science to industry editorially: "With respect to our country, we would hold with Mahatma Gandhi that the spinning wheel and the bullock cart should be protected so long as the state cannot provide for the victims of unemployment; on the other hand, there should be unremitting effort to adopt the modern technic to all the needs of industrial and economic life, and the old antiquated methods should be discarded without a sigh or tear when the proper insurance against unemployment has been made."

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Travel

RAND McNALLY ROAD ATLAS OF THE UNITED STATES, CANADA, AND MEXICO, 1935 ed.—*Rand McNally*, 104 p. Maps paper 75c.

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Paleontology

NEW SPECIES OF TERTIARY CHEILOSTOME BRYOZOA FROM VICTORIA, AUSTRALIA—Ferdinand Canu and Ray S. Bassler—*Smithsonian Inst.*, 54 p., 9 plates, 30c.

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Art Education

ART EDUCATION TODAY—Ed. by members of the Fine Arts Staff of Teachers College, Columbia University—*Teachers College*, 78 p., plates, \$1.25. A forum to which artists and teachers have contributed their distinctive viewpoints. The varied subjects include textile design, geometry in art, a Mexican school of sculpture, art education as a social study, and the motion picture in art education. The editors express the hope that this publication will continue as an annual to record significant contemporary ideas and experiments.

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Scientific Biography

MEMORIES OF A SCIENTIFIC LIFE—Sir Ambrose Fleming—*Zondervan Publ. House*, 244 p., \$2. Probably only one person out of a thousand who owns a radio set knows who Sir Ambrose is; but every one should. In England the radio tubes of sets are known as valves and commonly referred to as Fleming valves. Sir Ambrose's pleasing account of his rich, full life discloses much more than his intimate contact with wireless telegraphy in the early years and radio in the later ones. He was scientific consultant for Edison in his British telephone and electric light ventures, which is a whole story in itself. Sir Oliver Lodge writes the foreword.

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Sound

ANECDOTAL HISTORY OF THE SCIENCE OF SOUND TO THE BEGINNING OF THE 20TH CENTURY—Dayton Clarence Miller—*Macmillan*, 114 p., \$2.50. Prof. Miller is particularly adapted by his own contributions to the field of sound to fill a long-existing gap in the historical treatment of this interesting field of science. How large the gap has been up to the appearance of the present book can be judged when Prof. Miller points out that in four of the most widely used histories of science, which total over 2,000 pages, there are only a dozen pages discussing sound. The author's avocation of studying the science of musical instruments makes a section devoted to them one of the most fascinating parts of the book.

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